

**CLAIMS:**

1. A fibre optic communications network comprising:  
a fibre optic loop;  
an optical time domain reflectometry transceiver connected to one or both ends of the loop, for detecting disturbances to the loop; and  
a multiplicity of modulators spaced along the loop and coupled non-intrusively to the fibre optic loop, for transmitting signals into the loop by non-optical local modulation of the fibre optic material;  
the transceiver being arranged to identify and decode those signals individually using optical time domain reflectometry, whereby telemetry may be performed from the modulators to the transceiver.
2. A network according to Claim 1, in which the transceiver is a coherent optical time domain reflectometry transceiver, arranged to locate and decode the signals using coherent optical time domain reflectometry.
3. A network according to Claim 1, in which the transceiver is arranged to locate the modulators along the loop, whereby to identify the sources of the corresponding signals.
4. A network according to Claim 1, in which the modulators are electromechanical and vibrate the loop locally.
5. A network according to Claim 1, in which the modulators are electromagnetic and generate an electromagnetic field across the loop.
6. A network according to Claim 1, in which the modulators include signal generators for generating the signals in response to an external input.

7. A network according to Claim 6, in which the external input comprises data from a local detector.
8. A network according to Claim 6, in which the signals comprise data representative of the identity of the modulator.
9. A method of telemetry on a fibre optic loop, using an optical time domain reflectometry transceiver connected to one or both ends of the loop, comprising applying a local modulation, at any one of a plurality of spaced locations along the loop, to transmit a signal non-intrusively into the loop by non-optical local modulation of the fibre optic material, and using the transceiver to identify and decode those signals using optical time domain reflectometry, whereby signals are sent from selected locations along the loop to the transceiver.
10. A method according to Claim 9, in which the signals are identified and decoded using coherent optical time domain reflectometry.
11. A method according to Claim 9, including locating the origin of each said signal along the loop.
12. A security system for controlling access to an enclosed conduit along which runs fibre optic cable, the conduit having a cover for access to the cable, the system having a communications receiver and a modulator responsive to an output of the receiver for coupling non-intrusively to the fibre optic cable adjacent the cover, the communications receiver being responsive to the presence or absence of an access authorisation signal from an operator to cause the modulator to introduce a signal to the fibre optic cable indicative of the authorisation status.
13. A security system according to Claim 12, comprising means for detecting opening of the cover and providing a corresponding signal to the communications

receiver, the communications receiver being responsive additionally to the signal from the detecting means to cause the modulator to introduce a signal to the fibre-optic cable indicative of attempted cover opening with or without access authorisation.

14. A security system according to Claim 13, comprising means responsive to the signal from the detecting means for providing a counter measure to the threat of unauthorised access to the cable, in the event of non-receipt of an access authorisation signal.

15. A security system according to Claim 12, comprising an optical time domain reflectometry transceiver connected to one or both ends of the fibre-optic cable, for decoding the signal introduced by the modulator.

16. A security system comprising multiple receivers and modulators according to Claim 12, spaced along a common fibre optic cable in respective manholes, and a coherent optical time domain reflectometry transceiver connected to the fibre optic cable, for locating and decoding the signal introduced by any of the modulators.

17. A security system according to Claim 15, in which the transceiver is arranged to provide an indication of the location of the modulator along the fibre optic cable and hence the origin of the signal, to enable an operator to identify the specific cover.

18. A security system according to Claim 12, in which the modulator is arranged to provide different signals, indicative respectively of the receipt and the non-receipt of an authorisation signal.

19. A security system according to Claim 12, in which the communications receiver has means for verifying the authenticity of a received signal to determine whether it is an access authorisation signal.

20. A security system according to Claim 19, in which the communications receiver has means for transmitting a signal to an operator and the verifying means is arranged to compare the transmitted and the received signals to determine whether access should be authorised.

21. A security system according to Claim 12, in which the communications receiver stores data indicative of transmissions received and made, to provide a record of cover accessing or attempted accessing activity.

22. A security system according to Claim 12, including a manhole cover for controlling access to the cable.

23. A security system according to Claim 22, in which the manhole cover has a lock.

24. A security system according to Claim 22, comprising a battery in or adjacent to the manhole cover for operating the communications receiver.

25. A security system according to Claim 24, in which the manhole cover has a battery for operating the lock and the communications receiver.

26. A security system according to Claim 12, in which the modulator comprises an electromechanical transducer for vibrating the fibre optic cable directly or indirectly.

27. A security system according to Claim 12, comprising a transmitter for use by the operator to send an access authorisation signal to the communications receiver.

28. A security system according to Claim 27, comprising a plurality of fibre optic cables and respective receivers and modulators.

29. A method of controlling access to an enclosed conduit along which runs fibre optic cable, the conduit having a cover for access to the cable, comprising receiving, locally to the cover, a signal from a person attempting to gain access, authenticating that signal, and providing a signal non-intrusively to the fibre optic cable adjacent the cover by non-intrusive coupling, indicative of authorisation status.

30. A method according to Claim 29, further including detecting opening or attempted opening of the cover, and providing non-intrusively a signal indicative of attempted opening onto the fibre optic cable adjacent the cover.

31. A method according to Claim 29, comprising identifying the signals provided on the fibre optic cable non-intrusively, using optical time domain reflectometry along the cable from a remote station.

32. A method according to Claim 31, using coherent optical time domain reflectometry, and including identifying the location of the origin of the signal.

33. A fibre optic communications network comprising:  
a fibre optic loop;  
optical time domain reflectometry receiving and transmitting means connected to one or both ends of the loop, for detecting disturbances to the loop; and  
modulating means spaced at multiple locations along the loop and coupled non-intrusively to the fibre optic loop, for transmitting signals into the loop by non-optical local modulation of the fibre optic material;  
the receiving and transmitting means being arranged to identify and decode those signals individually using optical time domain reflectometry, whereby telemetry may be performed from the modulating means to the receiving and transmitting means.

34. A security system for controlling access to an enclosed conduit along which runs fibre optic cable, the conduit having cover means for access to the cable, the system

having a communications receiver means and a modulator means responsive to an output of the receiver means for coupling non-intrusively to the fibre optic cable adjacent to the cover means, the communications receiver means being responsive to the presence or absence of an access authorisation signal from an operator to cause the modulator means to introduce a signal to the fibre optic cable indicative of the authorisation status.